

**What is claimed is:**

1. A method for using ammonium fluoride solution in photoelectrochemistry etching process of a silicon wafer, comprising the steps of:  
placing the wafer after a pre-etching process into an alcohol solution for  
5 activating the surface of the wafer and into an ammonium fluoride solution for  
an etching solution; and  
illuminating the back of the wafer with a halogen light and performing a  
photoelectrochemical etching process in a potentiostatic.
2. The method of claim 1, wherein the concentration of ammonium fluoride  
10 is from 1.0 to 2.5 M.
3. The method of claim 1, further comprising a step of:  
adding an ammonium chloride solution within the photoelectrochemical  
etching process in potentiostatic.
4. The method of claim 3, wherein the concentration of the ammonium  
15 chloride solution is from 0.1 to 1.5 M.
5. The method of claim 1, wherein the brightness of halogen light is 50W,  
11000 to 20000 Lx.
6. The method of claim 1, wherein the potential of the potentiostatic is from  
0.25 V to 1.0 V.
- 20 7. The method of claim 1, wherein the temperature of the  
photoelectrochemical etching process is from 10 to 90°C.